CITY OF GLENNS FERRY (PWS 4200022)
SOURCE WATER ASSESSMENT FINAL REPORT

April 24, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for City of Glenns Ferry, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The City of Glenns Ferry drinking water system consists of a spring and a backup well. The spring has a high susceptibility to microbial and inorganic compounds (IOCs) due to a total coliform detection in the spring gallery in July 1997 and recorded nitrate concentrations that exceed the maximum contaminant level (MCL) of 10 parts per million (ppm) in September 1998. The spring is located within 100 feet of the Snake River, a possible source of contamination. The backup well has a moderate susceptibility to all potential contaminant categories. For the most part, the high hydrologic sensitivity scores as well as the lack of a well log contributed greatly to the moderate susceptibility scores for the well. The delineations of both the spring and the well cross nitrate and fluoride priority areas, adding points to the overall susceptibly scores.

Neither the spring nor the well has recorded the presence of synthetic organic compounds (SOCs) or volatile organic compounds (VOCs) during any water chemistry tests. Total coliform bacteria have been detected in the spring gallery and in the distribution system in July 1997. However, total coliform bacteria have not been detected at the well. The IOCs chromium, arsenic, and fluoride have been detected, but at levels far below the current MCLs set by the EPA, even though the delineations cross a fluoride priority area. The spring has recorded nitrate concentrations consistently above 7 ppm and in September 1998, concentrations were recorded at 10.3 ppm. The MCL for nitrate is 10 ppm. The backup well has also recorded consistently high nitrate concentrations between 5 mg/L and 8 mg/L, levels greater than one-half of the MCL. See Graph 1 in Attachment A.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Glenns Ferry, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Engineering controls, such as reverse osmosis or ion exchange, should be considered to manage the nitrate concentrations of the spring and the backup well. No application or storage of herbicides, pesticides, or other chemicals is allowed within 50 feet of a public water system well. Many springs are fed by water that is fairly close to the ground surface and are very susceptible to contamination by percolating water that has picked up pollutants as it moves through the soil. Thus wastewater land application sites, septic systems, trash dumps, underground storage tanks, the Snake River, and other pollutant sources should not be located on land above the spring. Should microbial contamination continue to be a problem, appropriate disinfection practices would need to be revised and maintained for the system to meet drinking water standards. Since the delineations underlie urban and residential land, storm water drainage may be a consideration. Collaboration and partnerships with state and local agencies and industry groups are critical to the success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations contain some urban and residential land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Idaho Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Elmore Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality (DEQ) or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF GLENNS FERRY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment are also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the EPA to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The public drinking water system for the City of Glenns Ferry is comprised of a spring and a backup well that serve approximately 1,400 people through approximately 645 connections. Both the well and spring are located in Elmore County, in the town of Glenns Ferry. The spring is located approximately 100 feet from the Snake River on the west side. The well is located on E. Harrison Street on the south side of the railroad tracks (Figure 1). Water is stored in two 250,000 gallon storage tanks. Chlorine disinfection is used in the distribution system.

Current significant water chemistry problems are related to the detection of the IOC nitrate and total coliform bacterial detection in the spring gallery for the City of Glenns Ferry drinking water system. Nitrate concentrations in both the spring and the well have been consistently above one-half of the MCL of 10 ppm. In September 1998, the spring recorded a nitrate concentration of 10.3 ppm and the well recorded a nitrate concentration of 9.2 ppm. See Graph 1 in Attachment A. Regularly, the spring records concentrations above 7 ppm and the well records concentrations above 6 ppm. The spring is located within 100 feet of the Snake River, a possible source of contamination. Additionally, the delineations of the spring and well cross a nitrate and a fluoride priority area. However, fluoride concentrations have been far below the MCL. In July 1997, total coliform bacteria were detected in the spring gallery and in the distribution system.

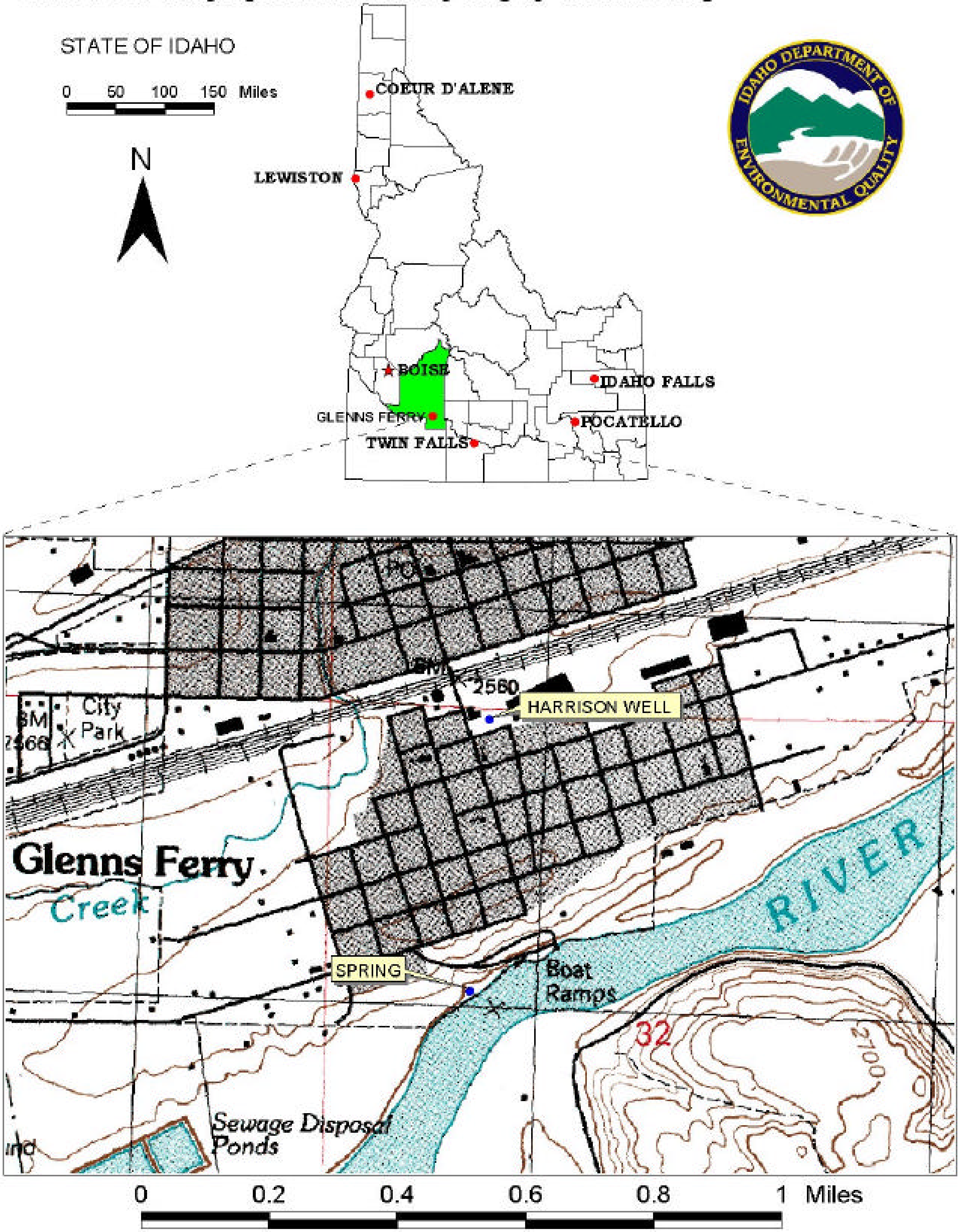
Neither the spring nor the well has recorded the presence of VOCs or SOCs during any water chemistry tests. The IOCs chromium, arsenic, and fluoride have been detected in the drinking water system at levels far below the MCLs set by EPA. County level nitrogen fertilizer use, county level herbicide use, and total county level ag-chemical use have been rated as high for this area.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with BARR Engineering to perform the delineations using a combination of MODFLOW and a refined analytical element computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Mountain Home Plateau aquifer in the vicinity of the City of Glenns Ferry. The computer models used site specific data, assimilated by BARR Engineering from a variety of sources including local area well logs and hydrogeologic reports (detailed below).

The Mountain Home Plateau is a broad, flat plateau, which slopes gently towards the southwest. The plateau is broken by volcanic structures – crater rings, cinder cones, and shield volcanoes. The plateau generally is above 3,000 feet in altitude, except in the extreme western part. All streams draining the plateau are ephemeral, flowing south toward the Snake River. The larger streams draining the Danskin Mountains to the north are fed by springs in the Tertiary volcanics and Cretaceous granites. Characterized by hot, dry summers and cold winters, the climate of the plateau is semi-arid. Average annual precipitation ranges from nine inches on the plateau to about 23 inches in the mountains (Norton et al., 1982).

FIGURE 1. Geographic Location of City of Glenns Ferry



The major geologic units in the Mountain Home Plateau are: 1) alluvium and younger terrace gravels, 2) Snake River Group, 3) Idaho Group, 4) Idavada Volcanics, and 5) Idaho Batholith. The basalts are considerably thicker in the northern section of the study area. Two of the formations of the Idaho Group, the Glenns Ferry Formation and the Bruneau, are the main aquifer systems (Ralston and Chapman, 1968). The basalts of the Bruneau Formation thin rapidly to the east and to the south. Two parallel northwest trending faults cut through the area. An apparent third fault, trending east from Cinder Cone Butte, bisects one of the northwest faults near Cleft. Several volcanic structures are present on the plateau including Crater Rings, Cinder Cone Butte, and Lockman Butte (Norton et al., 1982). There are two main aquifers in the Mountain Home area: 1) a shallow, perched system beneath Mountain Home and 2) a deeper, regional system.

The perched system underlies approximately 38,000 acres extending from about 10 miles south to 4 miles north of the City of Mountain Home with a 4 mile width in the area of the City (Young, 1977). For the most part, ground water in the perched system is in the clay, silty, sand, and gravel layers of the Quaternary Alluvium. Depth to water in the shallow system can be less than 10 feet but varies considerably along the limits of the perched system as the water moves vertically down the regional system (Norton et al., 1982). Recharge to the perched system occurs from Rattlesnake and Canyon Creeks as well as seepage from Mountain Home Reservoir and the canals and laterals that distribute the water. Natural discharge from the perched system occurs mainly as downward percolation to the regional system and as spring flow at Rattlesnake Spring near the Snake River Canyon rim. The direction of flow in the perched ground water system is towards the southwest.

The deeper, regional aquifer supplies ground water to the large irrigation wells and municipal wells for Mountain Home and the Air Force base. The major rock types are basalts of the Bruneau Formation, Idaho Group, and poorly consolidated detrital material and minor basalt flows of the Glenns Ferry Formation, Idaho Group. Well yields from the basalts of the Bruneau Formation range from 10 to 3500 gallons per minute (gpm). The range of the well yields for the Glenns Ferry Formation is three to 350 gpm. The Bruneau Formation thins rapidly towards the east where the Glenns Ferry Formation becomes the major source of ground water (Norton et al., 1982).

The Glenns Ferry Formation, a thick intertongueing deposit of lake and stream sediments, is the primary aquifer in the eastern portion of the area. Due to the fine-grained nature of the sediments, the permeability and yield to wells is generally low. The formation is composed of tan, gray, and white clay, silt, and fine to medium sand (Ralston and Chapman, 1968). The formation has been noted as being 2000 feet thick near Glenns Ferry (Malde and Powers, 1962).

The sediments and basalt of the Bruneau Formation are the primary aquifers in the Mountain Home area. The jointing, fracturing, and vesicular character of the basalts causes them to be very permeable. The majority of ground water withdrawal from the formation is from deeper interflow zones and a thin but extensive series of sand beds just below the lower basalt unit. The unit has approximately 1500 feet of lake and stream sediments with numerous basalt interbeds. The basalts tend to be dark gray to black when fresh but weather to a reddish gray-brown color. Most of the interflow zones contain large quantities of glassy cinders and some ash (Ralston and Chapman, 1968).

Ralston and Chapman (1968 and 1970) found that recharge to the ground water system in the eastern potion of the Mountain Home Plateau is limited due to low amounts of precipitation, relatively impermeable material in the area of most precipitation, and high evapotranspiration rates. Recharge to the regional system occurs as downward percolation of precipitation that falls on the mountains, losses from intermittent stream flows, and from downward percolation from the perched system. Discharge from the regional system occurs as spring flow, underflow to the Snake River, and pumpage.

In general, the direction of ground water flow is towards the southwest with a southern component in the southeast and a western component in the northwest. Low permeability along the apparent east-west trending fault through Cleft limits the flow to the north. The ground water elevation is 70 to 165 feet higher on the south side of the fault (Norton et al., 1982).

The delineated source water assessment areas for the City of Glenns Ferry can best be described as oval corridors extending northwest approximately one-fourth mile long and one-fifth mile wide (Figures 2 and 3). The well delineation begins near Harrison Street, crosses the railroad tracks and runs through the city. The spring delineation begins at the Snake River and heads northwestward crossing into the city. The actual data used by BARR Engineering in determining the source water assessment delineation areas are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the City of Glenns Ferry wellhead and spring consists of residential and urban land, while the surrounding area is predominantly urban and irrigated agriculture. A potential wastewater land application (WLAP) site is proposed for a location upgradient of the City of Glenns Ferry wellhead and spring.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the <u>potential</u> for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Figure 2. City of Glenns Ferry Delineation Map and Potential Contaminant Source Locations

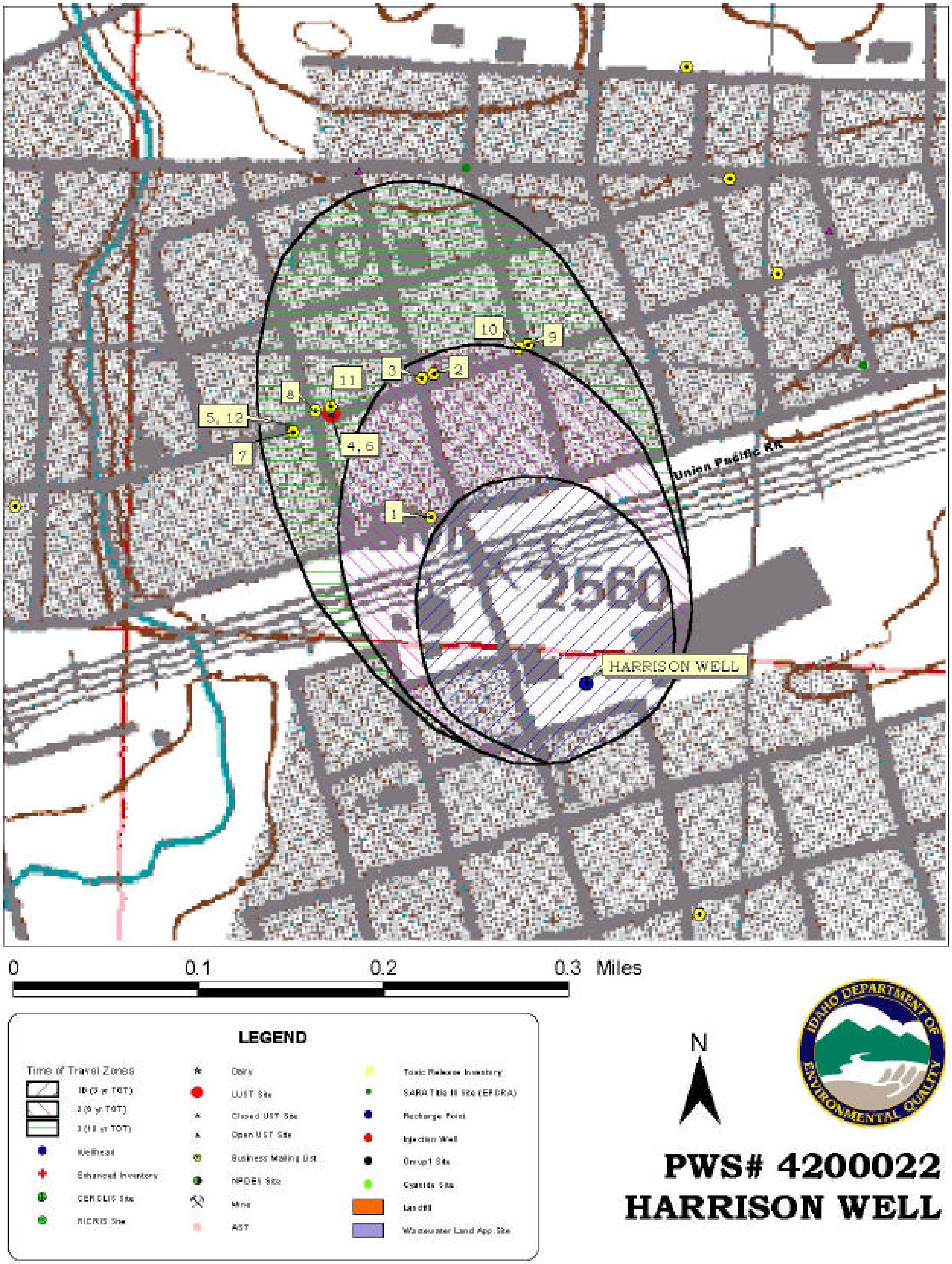
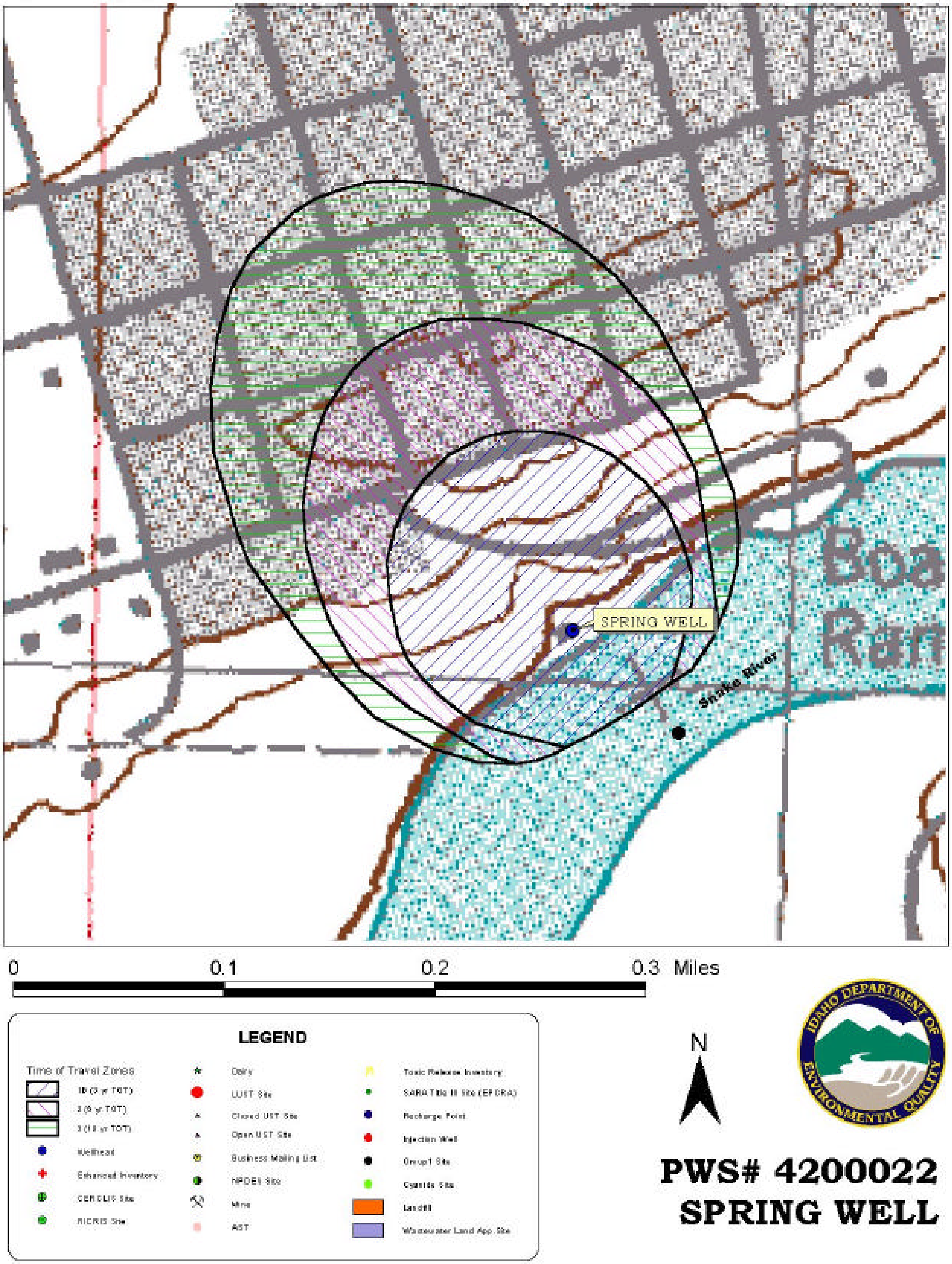


Figure 3. City of Glenns Ferry Delineation Map and Potential Contaminant Source Locations



Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in October and November 2001. The first phase involved identifying and documenting potential contaminant sources within the City of Glenns Ferry source water assessment areas (Figures 2 and 3) through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the area.

The delineated source water area of the spring contains the Snake River as a potential source of contamination. This surface water could potentially contaminate the aquifer with leachates or surface runoff (Table 2). The delineated source water area of the well contains several businesses in the 6-year and 10-year time of travel (TOT) zones. The area also includes a few underground storage tanks (USTs), afarm, and a fire department. The railroad tracks, a major transportation corridor, fall within the 3-year TOT of the well. A spill occurring in this corridor could contribute IOCs, VOCs, SOCs, and microbial contaminants to the aquifer. (Table 1).

Table 1. City of Glenns Ferry Well, Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Hardware-Retail	3 – 6	Database Search	IOC, VOC, SOC
2	General Contractors	3 – 6	Database Search	IOC, VOC, SOC
3	Farms	3 – 6	Database Search	IOC
4, 6	LUST – Site Cleanup Completed, Impact Unknown; UST – Closed	6 – 10	Database Search	VOC, SOC
5, 12	UST – Open; Gasoline Service Stations	6 – 10	Database Search	IOC, VOC, SOC
7	Automobile Repairing & Service	6 – 10	Database Search	IOC,VOC, SOC
8	Fire Departments	6 – 10	Database Search	IOC,VOC, SOC
9	Service Stations – Gasoline & oil	6 – 10	Database Search	IOC,VOC, SOC
10	Automobile Repairing & Service	6 – 10	Database Search	IOC,VOC, SOC
11	Automobile Dealers – New Cars	6 – 10	Database Search	VOC, SOC
	Railroad Tracks	0 – 10	GIS Map	IOC,VOC, SOC, Microbials

[1] LUST = Leaking underground storage tank, UST = underground storage tank
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Glenns Ferry Spring, Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Snake River	0 – 10	GIS Map	IOC, VOC, SOC, Microbials

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment B contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity rating of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity is high for the well (Table 3). Regional soils data show that the area is predominantly moderate to well-drained. Additionally, the well log for this well was unavailable, preventing a determination of the depth to ground water, composition of the vadose zone, or presence of low permeability layers.

Spring Construction

System construction of the spring directly affects the ability of the intake of the spring to protect the aquifer from contaminants. Spring construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the surface water system. Lower scores imply a system is less vulnerable to contamination. For example, if the intake structure of the surface water system is properly located and constructed to minimize impacts from potential contaminant sources, then the possibility of contamination is reduced and the system construction score goes down. If the system was constructed in a way that the infiltration gallery is separated from any surface water so as to provide some kind of natural filtration, the water quality is more protected and the system score is reduced.

The City of Glenns Ferry drinking water spring rated moderate susceptibility for system construction. According to a sanitary survey performed in 1995, the intake structure of the spring is protected from potential contaminant sources by a 10-foot square concrete box. However, the spring is located within 100 feet of the Snake River. The sanitary survey shows that spring is constructed using the natural collection gallery provided by the Snake River. Two 10-inch discharge lines run to this gallery.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced. A sanitary survey was conducted in 1995.

The well has a moderate system construction score. The well log was unavailable, preventing a determination of specific well construction information. However, the 1995 sanitary survey indicates that the well depth is 90 feet and that the 14-inch diameter casing is also set to 90 feet. It shows that the wellhead and surface seals are maintained to standards and that the wellhead is protected from surface runoff.

The lack of a well log did not allow a determination as to whether current public water system (PWS) construction standards are being met. Though the well may have been in compliance with standards when it was completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, surface casing vent, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Fourteen-inch diameter wells require a casing thickness of 0.375-inches. The well was assessed an additional point in the system construction rating even though it may have met standards at the time of installation.

Potential Contaminant Source and Land Use

The spring rated low for IOCs (i.e. nitrates, arsenic), SOCs (i.e. pesticides), VOCs (i.e. petroleum products), and microbial contaminants (i.e. bacteria). The well rated moderate for IOCs and it rated low for VOCs, SOCs, and microbial contaminants. The delineations of the spring and the well crossed nitrate and fluoride priority areas, adding to the IOC land use rating. The predominant urban land use also contributed to the overall land use scores.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, storing potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. In this case, nitrate concentrations above the MCL were recorded for the spring in September 1998 and total coliform bacteria were detected at the spring in July 1997, giving automatic high susceptibility scores to IOCs and microbial contaminants. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, the spring rates high susceptibility for IOCs and microbial contaminants and it rates moderate for SOCs and low for VOCs. The well rates moderate for all potential contaminant categories.

Table 3. Summary of City of Glenns Ferry Susceptibility Evaluation

Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Spring	---	M	L	M	L	L	H*	L	M	H*
Well	H	M	L	L	L	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
*** = Automatic high score due to the proximity of a road within 40 feet of the wellhead**

Susceptibility Summary

The spring rated high for IOCs and microbial contaminants, and it rated moderate for VOCs and low for SOCs. The high ratings can be attributed to nitrate concentrations recorded above the MCL and a detection of total coliform bacteria at the spring gallery. The well rated moderate for IOCs, VOCs, SOCs, and microbial contaminants. High hydrologic sensitivity, the predominant urban land use as well as the nitrate and fluoride priority areas contributed to the susceptibility ratings of the well.

Current significant water chemistry problems are related to the detection of the IOC nitrate and total coliform bacterial detection in the spring gallery for the City of Glenns Ferry drinking water system. Nitrate concentrations in both the spring and the well have been consistently above one-half of the MCL of 10 ppm. In September 1998, the spring recorded a nitrate concentration of 10.3 ppm and the well recorded a nitrate concentration of 9.2 ppm. See Graph 1 in Attachment A. Regularly, the spring records concentrations above 7 ppm and the well records concentrations above 6 ppm. Additionally, the delineations of the spring and well cross a nitrate and fluoride priority area. However, fluoride concentrations have been far below the MCL. In July 1997, total coliform bacteria were detected in the spring gallery and in the distribution system.

Neither the spring nor the well has recorded the presence of VOCs or SOCs during any water chemistry tests. The IOCs chromium, arsenic, and fluoride have been detected in the drinking water system at levels far below the MCLs set by EPA. County level nitrogen fertilizer use, county level herbicide use, and total county level ag-chemical use have been rated as high for this area.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of Glenns Ferry, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. Engineering controls, such as reverse osmosis or ion exchange, should be considered to manage the nitrate concentrations of the spring and the backup well. No application or storage of herbicides, pesticides, or other chemicals is allowed within 50 feet of a public water system well. Many springs are fed by water that is fairly close to the ground surface and are very susceptible to contamination by percolating water that has picked up pollutants as it moves through the soil. Thus wastewater land application sites, septic systems, trash dumps, underground storage tanks and other pollutant sources should not be located on land above the spring. Should microbial contamination continue to be a problem, appropriate disinfection practices may need to be revised and maintained for the system to meet drinking water standards. Since the delineations underlie urban and residential land, storm water drainage may be a consideration. Much of the designated protection areas are outside the direct jurisdiction of the City of Glenns Ferry, making collaboration and partnerships with state and local agencies and industry groups critical to the success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations contain some urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Idaho Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Elmore Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 373-7001 (mharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Malde, H.E. and Powers, H.A., 1962. Upper Cenozoic stratigraphy of Western Snake River Plain. Geological Society of America Bulletin, V.73: 1197-1220.

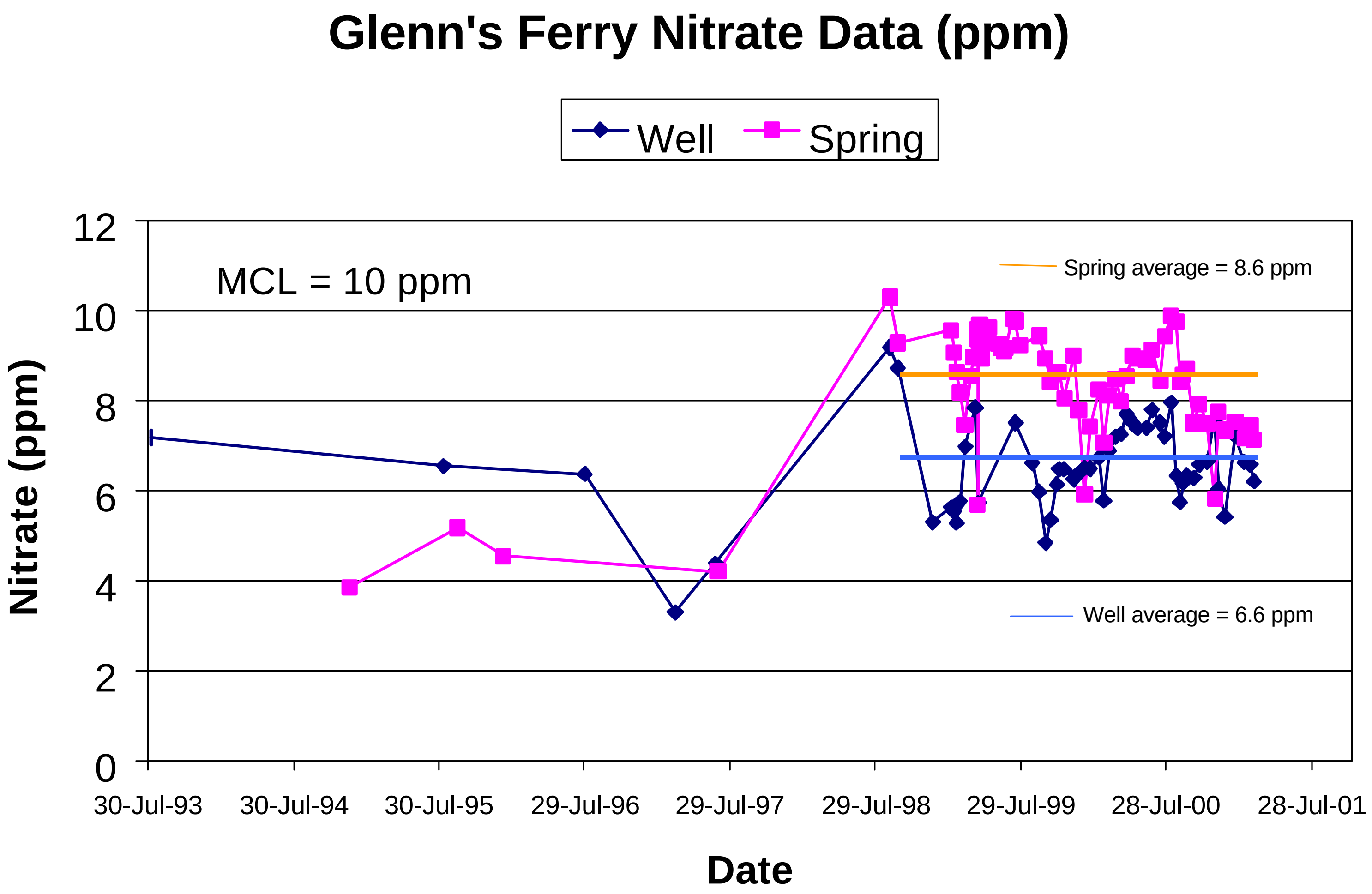
Norton, M.A., W. Ondrechen, and J.L. Baggs. 1982. "Ground Water Investigation of the Mountain Home Plateau, Idaho. Idaho Department of Water Resources," Open File Report August 1982.

Ralston, D.R. and S.L. Chapman. 1968. "Ground Water Resources in the Mountain Home Area, Elmore County, Idaho. Idaho Department of Reclamation," Water Information Bulletin #4. 63 pages.

Wuolo, R.W., J. Wittman, and D.M. Reynolds, 2001. "Summary Report: Delineation of Public Drinking Water Sources for the Source Water Assessment Program: Boise Valley and Mountain Home Plateau," BARR, Minneapolis, August 2001.

Young, H.W. 1977. "Reconnaissance of Ground Water Resources in the Mountain Home Plateau Area, Southwest Idaho," U.S. Geological Survey. Water Resources Investigations 77-108, Open File Report. 40 pages.

Attachment A
Graph 1: Glenn's Ferry Nitrate Data



Glenn's Ferry Nitrate Data (ppm)
Well
Spring
MCL = 10 ppm
Spring average = 8.6 ppm
Well average = 6.6 ppm
Nitrate (ppm)
Date
0
2
4
6
8
10
12
30-Jul-93
30-Jul-94
30-Jul-95
29-Jul-96
29-Jul-97
29-Jul-98
29-Jul-99
28-Jul-00
28-Jul-01

Attachment B

City of Glenn’s Ferry

Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2) for the well only

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375) for the well only

3) VOC/SOC/IOC/Microbial Final Score = System Construction + Potential Contaminant/Land Use for the spring only

Final Susceptibility Scoring for the well:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Final Susceptibility Scoring for the spring:

0 - 7 Low Susceptibility

8 - 15 Moderate Susceptibility

≥ 16 High Susceptibility

Surface Water Susceptibility Report   Public Water System Name : GLENNS FERRY CITY OF   Well# : SPRING

Public Water System Number 4200022   11/19/2001 7:08:27 AM

1. System Construction		SCORE			
Intake structure properly constructred	YES	1			
Infiltration gallery or well under the direct influence of Surface Water	YES	0			
Total System Construction Score		1			

2. Potential Contaminant Source / Land Use		IOC Score	VOC Score	SOC Score	Microbial Score
Predominant land use type (land use or cover)	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	YES	2	0	2	
Significant contaminant sources *	YES	Microbials Nitrate			
Sources of class II or III contaminants or microbials	present within the 500' of the intake and the	1	1	1	1
Agricultural lands within 500 feet	NO	0	0	0	0
Three or more contaminant sources	NO	0	0	0	0
Sources of turbidity in the watershed	YES	1	1	1	1
Total Potential Contaminant Source / Land Use Score		7	5	7	5
3. Final Susceptibility Source Score		8	6	8	6
4. Final Sourcel Ranking		High	Low	Moderate	High

* Special consideration due to significant contaminant sources
Source is considered High Susceptibility

Ground Water Susceptibility Report   Public Water System Name : GLENNS FERRY CITY OF   Well# : HARRISON WELL

Public Water System Number 4200022   11/16/2001 10:37:34 AM

1. System Construction		SCORE
Drill Date		
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1995
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		5	3	3	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		12	10	10	4
4. Final Susceptibility Source Score		12	12	12	12
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate